# FTP15N06N

## N-Channel MOSFET

**Lead Free Package and Finish**

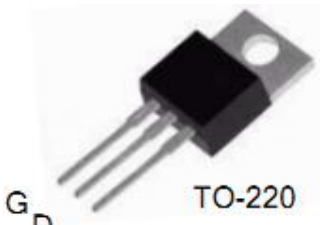
### Applications:

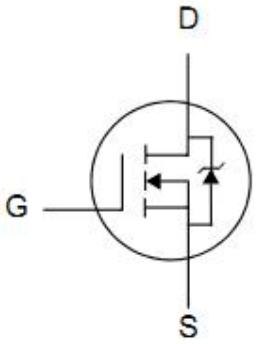
- Adaptor
- Charger
- SMPS

| $V_{DSS}$ | $R_{DS(ON)}$(Typ.) | $I_D$ (Silicon limited current) |
|---|---|---|
| 60V | 10mΩ | 80A |

### Features:

- RoHS Compliant
- Low ON Resistance
- Low Gate Charge
- Peak Current vs Pulse Width Curve
- Inductive Switching Curves




### Ordering Information

| PART NUMBER | PACKAGE | BRAND |
|---|---|---|
| FTP15N06N | TO-220 | ***IPS*** |

### Absolute Maximum Ratings

$T_C$=25℃ unless otherwise specified

| Symbol | Parameter | FTP15N06N | Units |
|---|---|---|---|
| $V_{DSS}$ | Drain-to-Source Voltage | 60 | V |
| $I_D$ | Continuous Drain Current | 80 | A |
| | Continuous Drain Current $T_C$ =100℃ | 50 | A |
| $I_{DM}$ | Pulsed Drain Current (NOTE *1) | 320 | A |
| $V_{GS}$ | Gate-to-Source Voltage | ±20 | V |
| $E_{AS}$ | Single Pulse Avalanche Energy(NOTE *2) | 247 | mJ |
| $T_L$ | Maximum Temperature for Soldering | 300 | ℃ |
| $T_J$ and $T_{STG}$ | Operating Junction and Storage Temperature Range | 150，-55 to150 | |

**OFF Characteristics** $T_C$=25℃ unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-to-Source Breakdown Voltage | 60 | -- | -- | V | $V_{GS}$=0V, $I_D$=250μA |
| $I_{DSS}$ | Drain-to-Source Leakage Current | -- | -- | 1 | μA | $V_{DS}$=60V, $V_{GS}$=0V $T_a$=25℃ |
| | | -- | -- | 500 | | $V_{DS}$=48V, $V_{GS}$=0V $T_a$=125℃ |
| $I_{GSS}$ | Gate-to-Source Forward Leakage | -- | -- | +100 | nA | $V_{GS}$=+20V |
| | Gate-to-Source Reverse Leakage | -- | -- | -100 | | $V_{GS}$= -20V |

**ON Characteristics** $T_J$=25℃ unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $R_{DS(ON)}$ | StaticDrain-to-Source On-Resistance | -- | 10 | 13 | mΩ | $V_{GS}$=10V, $I_D$=40A |
| $V_{GS(TH)}$ | Gate Threshold Voltage | 2 | 3 | 4 | V | $V_{DS}$=$V_{GS}$,$I_D$=250μA |
| Pulse width ≤300μs; duty cycle≤ 2% | | | | | | |

**Dynamic Characteristics** Essentially independent of operating temperature

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| Rg | Gate Resistance | -- | 1.3 | -- | Ω | f=1MHz, $V_{GS}$=0V, $V_{DS}$=0V |
| $C_{iss}$ | Input Capacitance | -- | 2130 | -- | pF | $V_{GS}$= 0V,$V_{DS}$ = 25V f =1.0MHz |
| $C_{oss}$ | Output Capacitance | -- | 215 | -- | | |
| $C_{rss}$ | Reverse Transfer Capacitance | -- | 160 | -- | | |
| $Q_g$ | Total Gate Charge | -- | 42.7 | -- | nC | $I_D$=40A,$V_{DD}$=48V $V_{GS}$ = 10V |
| $Q_{gs}$ | Gate-to-Source Charge | -- | 9.6 | -- | | |
| $Q_{gd}$ | Gate-to-Drain (“Miller”) Charge | -- | 16 | -- | | |

**Resistive Switching Characteristics** Essentially independent of operating temperature

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $t_{d(ON)}$ | Turn-on Delay Time | -- | 18.3 | -- | ns | $V_{DD}$=30V, $I_D$=40A, $V_G$=10V $R_G$=6Ω |
| $t_{rise}$ | Rise Time | -- | 7.9 | -- | | |
| $t_{d(OFF)}$ | Turn-Off Delay Time | -- | 37.8 | -- | | |
| $t_{fall}$ | Fall Time | -- | 11.4 | -- | | |

**Source-Drain Diode Characteristics** Tc=25℃ unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current (Body Diode) | -- | -- | 80 | A | $T_C$=25℃ |
| $I_{SM}$ | Maximum Pulsed Current (Body Diode) | -- | -- | 320 | A | |
| $V_{SD}$ | Diode Forward Voltage | -- | -- | 1.2 | V | $I_{SD}$=30A, $V_{GS}$=0V |
| $t_{rr}$ | Reverse Recovery Time | -- | 25.7 | -- | ns | $I_F$=20A di/dt=100A/us |
| $Q_{rr}$ | Reverse Recovery Charge | -- | 24.6 | -- | nC | |
| Pulse width ≤300μs; duty cycle ≤ 2% | | | | | | |

Notes:

*1. Repetitive rating; pulse width limited by maximum junction temperature.

*2. L=0.5mH, $I_D$=31.4A, Start $T_J$=25℃

## Test Circuits and Waveforms

**Figure 14. Gate Charge Test Circuit**

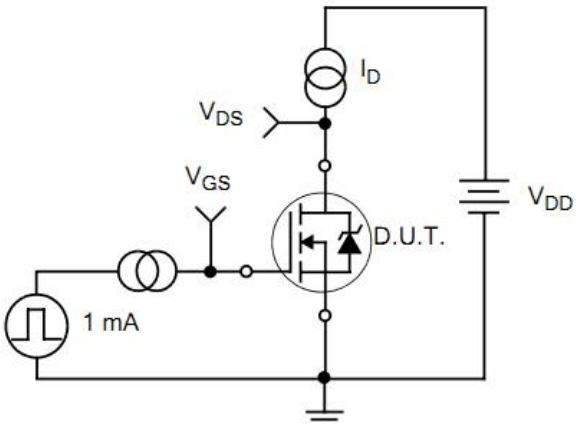



**Figure 15. Gate Charge Waveforms**

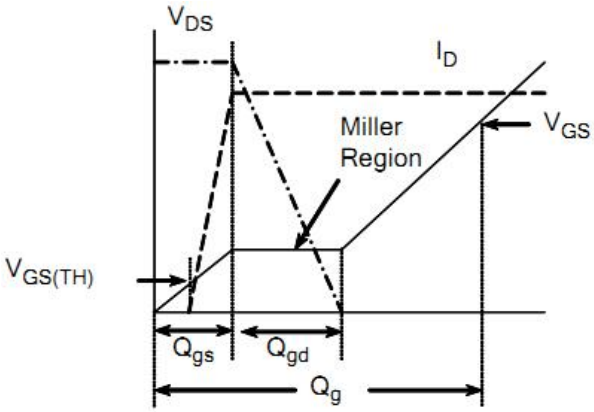



**Figure 16. Resistive Switching Test Circuit**

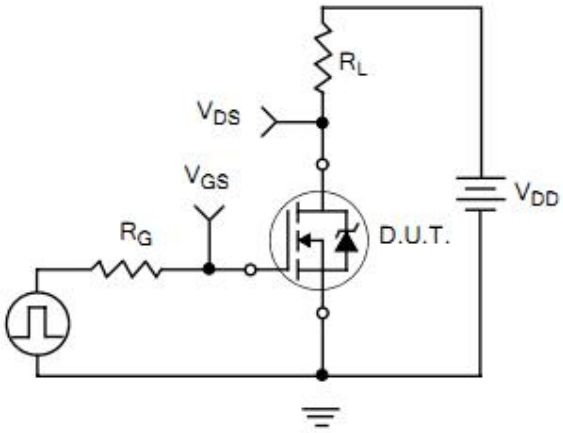



**Figure 17. Resistive Switching Waveforms**

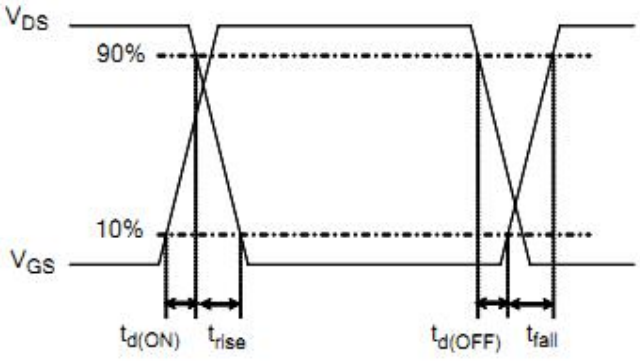


**Figure 18. Diode Reverse Recovery Test Circuit**

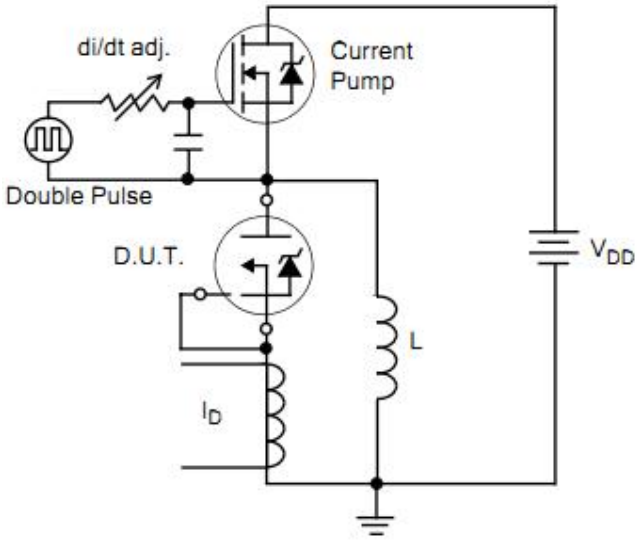



**Figure 19. Diode Reverse Recovery Waveform**

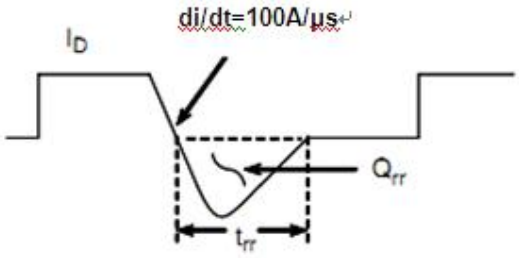



**Figure20.Unclamped Inductive Switching Test Circuit**

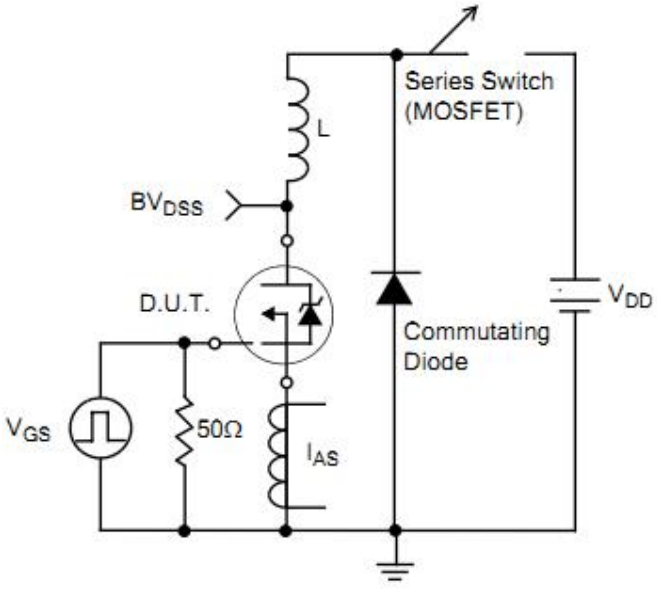
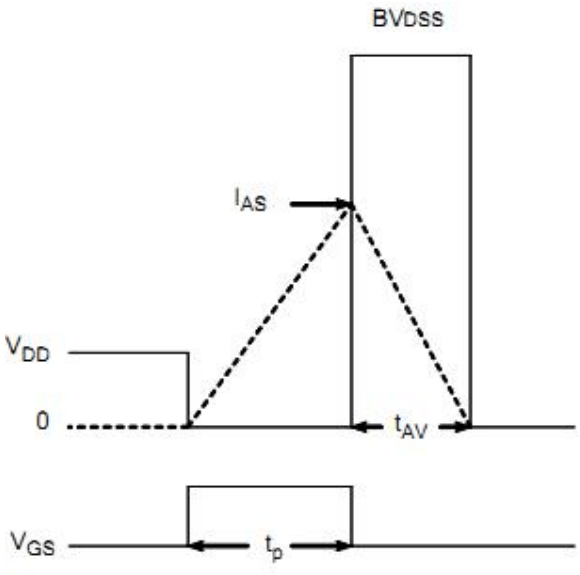



**Figure21.Unclamped Inductive Switching Waveform**




$$E_{AS} \quad \frac{I_{AS}^{2} L}{2}$$

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